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Long-Term Economic Performance of Alternative, Conventional, and Reduced Tillage Farming Systems in East-Central and Northeast South Dakota; Grain Prices: Seasonal High May Be Past

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LONG-TERM ECONOMIC PERFORMANCE OF ALTERNATIVE, CONVENTIONAL, AND REDUCED TILLAGE FARMING SYSTEMS IN EAST-CENTRAL AND NORTHEAST SOUTH DAKOTA*

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South Dakota State University's Plant Science and Economics Departments have recently completed long-term studies in east-central and northeast South Dakota (SD) comparing the agronomic and economic performance of alternative, conventional, and reduced tillage farming systems. These studies started with the 1985 crop year, and major components were completed following the 1992 crop year. In this issue of the Commentator, we briefly summarize the economic findings.

East-central SD Paired Comparison

An "Alternative" and a "Conventional" farm in Lake County of east-central SD, in the same neighborhood and with similar soils, were compared over the period 1985-92. The Alternative (Alt) farm was "organic" (i.e., free of purchased synthetic chemical input use) on most of its land during this period. It averaged approximately 750 acres of cropland, and its principal rotation covered 4 years and included (in sequence) small grain under-seeded with alfalfa-alfalfa-soybeans-corn. Recently, the farm began to move to a 5-year rotation that includes soybeans 2 years out of 5, instead of 1 out of 4.

The Conventional (Conv) farm used primarily a 2-year corn-soybean rotation and averaged approximately 830 crop acres. It is considered "conventional" in its use

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*Jerry Kelderman assisted with some of the calculations. The research was supported in part by a US Dept. of Agriculture SARE grant under agreement No. 92-COOP-1-7266.

GRAIN PRICES: SEASONAL HIGH MAY BE PAST

by

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Corn and soybean pricing opportunities exist at current price levels. On the monthly chart, corn price closes since 1984 have exceeded the current Chicago Board of Trade $2.85 price only two times. The two high prices came during summer weather scares and the price always tailed off before harvest and continued to tail off after harvest. This is the description of a typical short crop seasonal price pattern.

Soybean price rallied to very high levels during the summer drought of 1988 and then tailed off to just above $7.00. When it was evident that a normal crop would be harvested in 1989, soybean futures continued to drop to below $6.00. Soybean futures price did not exceed $7.00 again until the summer of 1993. If history does repeat itself, the current soybean and corn prices may be at their highs for the 1993-94 marketing year that ends in August of 1994.

It is prudent to consider selling at least a portion of your 1993 harvest at this time. It will take very good export sales to keep the prices at current levels. Importers and feeders will buy hand-to-mouth in expectation of the seasonal price pattern of lower prices after the short crop highs at harvest time. Also, South American row crop plantings are large and record production is possible.

Another reason to consider some sales at this time is the narrow basis that exists in most parts of the state. Often storage profits come from the narrowing of the basis after harvest time. That will not occur this year unless the post-harvest basis becomes abnormally narrow.

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of purchased chemical inputs, through the operator used reduced tillage practices and drilled his soybeans during much of the study period.

Both the Conv and the Alt farm are considered well managed, given the respective production strategies they have chosen. Hog and beef cattle are part of both farms, but the livestock operations were not included in the analysis reported here.

Results for the 8-year study period are summarized in Table 1. Direct (cash, or operating) costs other than labor for the Alt farm were roughly half those of the Conv farm. However, the Conv corn-soybean farm averaged $68/A in net income over all costs except management for the 8-year period, whereas the largely organic Alt farm averaged $40/A (ignoring organic premiums) with its small grain-alfalfa-soybeans-corn rotation. Over the 4-year 1989-92 period, organic price premiums added an average of $7/A to net returns for the Alt farm--enough to narrow but by no means close the net income gap between the two farms. The higher net returns for the Conv system are attributable to a number of factors, including: (1) higher corn and soybean yields on the Conv farm; (2) a much higher proportion of acreage in relatively profitable corn and soybeans on the Conv farm (84%) than on the Alt farm (50%); and (3) slightly higher Federal farm program payments on the Conv farm ($26/A) than on the Alt farm ($23/A).

Table 1. 1985-1992 Averaged Results from East-central SD Farming Systems Comparison

	Dollars/Acre				
	Direct Costs Other Than Labor	Gross Income	Net Income Over All Costs Except land, Labor, and Management	Net Income Over All Costs Except Land and Management	Net Income Over All Costs Except Management*
System					
Alternative	45	164	87	75	40
Conventional	88	227	111	104	68

*Net income over all costs except managment for the period 1986-92 were $41/A for the Alternative system and $71/A for the Conventional system.

Northeast Research Station Comparisons

Similar economic analyses were conducted for farming systems in two studies at SDSU's Northeast Research Station north of Watertown in Codington County. Study I emphasized row crops in three rotational systems: (1) Alternative (Alt), patterned after the Alt farm crop system in Lake County, consisting of oats underseeded with alfalfa-alfalfa-soybeans-corn, with no commercial fertilizer or pesticides and no moldboard plow; (2) Conventional (Conv), with a corn-soybeans-spring wheat rotation and recommended purchased chemical inputs; and (3) Ridge-till (R-T), also with a corn-soybeans-spring wheat rotation and recommended chemical inputs. The oats/alfalfa plots of the Alt system received a fall application of feedlot manure.

Study II emphasized small grains and included three systems: (1) Alternative (Alt), consisting of oats underseeded with a mix of sweet and red clover-clover (green manure)-soybeans-spring wheat, with no commercial fertilizer or pesticides and no moldboard plow; (2) Conventional (Conv); and (3) Minimum-till (M-T). The latter two systems consisted of soybeans-spring wheat-barley rotations in which recommended chemical inputs were applied. The systems in Study II were designed to require less water than the systems in Study I. Small grains have traditionally been an important part of the crop mix in northeastern SD because of both moisture limitations and the short growing season.

Yield and cultural practice information from the NE Station studies were used--together with input and crop price information, Federal farm program provisions, and other enterprise budget information--to simulate whole-farm and per acre profitabilities of the different systems. Data for 1985, the first year of the study, have been dropped from the results reported here because some practices were unique to the start-up year. Also, since only Study II was continued into the 1993 crop year, no results for 1993 are included.

Average economic results for the period 1986-92 are shown in Table 2. Direct costs other than labor averaged from 27 to 49 percent less for the Alt systems than for the systems with which they were compared. The Alt system in Study I was found to be more profitable, on average, than the Conv and R-T systems in that study. Also, net income variability, as measured by the coefficient of

Table 2. 1986-92 Averaged Results from Northeast Research Station Farming Systems Studies

System*	Direct Costs Other Than Labor	Gross Income	Net Income Over All Costs Except Land, Labor, and Management	Net Income Over All Costs Except Land and Management	Net Income Over All Costs Except Management
	Dollars/Acre				
Farming Systems Study I					
1. Alternative (oats-alfalfa-soybeans-corn)	45	153	75	63	37
2. Conventional (corn-soybeans-s. wheat)	62	151	58	49	23
3. Ridge Till (corn-soybeans-s. wheat)	69	139	41	32	6
Farming Systems Study II					
1. Alternative (oats-clover-soybeans-s. wheat)	30	101	47	38	12
2. Conventional (soybeans-s. wheat-barley)	48	127	49	39	13
3. Minimum Till (soybeans-s. wheat-barley)	59	116	29	20	-6

*Crops are shown in the order in which they occur in each rotation.

variation, was found to be much lower for the Alt system. In Study II, the Alt and Conv systems were of roughly equal profitability, on average, and their net income variability was about the same. The M-T system had the lowest average and most variable net income of the systems in Study II.

A supplemental analysis was conducted to estimate the role of alfalfa in the relatively strong economic performance of the Alt system in Study I. We used "normalized" budgets and hypothesized alfalfa being added to crop mixes of the Conv and R-T systems of Study I--in the same proportions to total cropland as in the Alt system. We assumed that alfalfa was left standing for 4 years of harvest, rather than 1 as in the case of the Alt system. Yields of Conv and R-T system alfalfa were assumed to be the same as those of Alt system, however. This analysis showed that the Conv system would have been slightly more profitable (by $2/A) than the Alt system. The R-T system would have increased in profitability, also, but it still would have been less profitable (by $11/A) than the Alt system.

This supplemental analysis was much less firmly grounded in agronomic data than was the rest of the economic analysis, which was based on actual production practices, levels of input use, yields, etc. For example, the assumed yield for 4-year stand alfalfa in the supplemental analysis may be unrealistically high in comparison to the actual yield for the 1-year stand Alt system alfalfa.

Concluding Observations

Results of these farming systems studies in two different locations of SD are not directly comparable because of the different types of research methods and data sources used. However, these and some other sustainable agriculture studies indicate that alternative farming systems based upon more diverse crop rotations which (1) include legumes and small grains and (2) eliminate or greatly reduce the use of purchased chemical inputs are presently more economically competitive in agro-climatic areas with limited rainfall and short growing seasons (e.g., where the NE Research Station is located) than in agro-climatic areas within or closer to the U.S. Corn Belt (e.g., Lake County in east-central SD).

More detailed analysis of the east-central SD paired comparison is presently underway. Detailed findings of the NE Station farming system studies are contained in SDSU Agricultural Experiment Station Bulletin 718, entitled **Agronomic, Economic, and Ecological Relationships in Alternative (Organic), Conventional, and Reduced-till Farming Systems** (James Smolik, editor). Single copies may be obtained at no charge by contacting:

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(Grain ... cont'd from p.1)

The chance of a weather market rally in the spring and summer of 1994 is greater than usual because the carry over stocks of both corn and soybeans will be tight. Producers should be ready to market any remaining 1993 crop at that time and also be prepared to forward price a portion of 1994 crop. The more aggressive marketer may even want to be prepared to market several years expected crop production, if a weather rally pushes futures prices to 1977 or 1988 levels of over $10.00 per bushel for soybeans and $3.50 for corn. Remember, these price levels occur only once or twice every decade.

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The producer on the other side of the market equation who is buying feeds should also be attentive to these potential market developments. A narrow basis and short crop seasonal price pattern usually signal a hand-to-mouth buying strategy. However, if exports begin to pick up the pace and South American growing conditions deteriorate, the feeder needs to be ready to price grain for feeding purposes. Current futures price carrying charges are small and, with the narrow basis, signal a potential feed forward pricing opportunity. A forward pricing futures strategy should be considered, if you expect a flat market with potential widening of the basis. Also, if you want to avoid the stress of riding out extremely volatile and potentially high prices on a weather market next spring and summer, forward pricing or buying a call option is a marketing possibility.

In conclusion, seller, prepare a market plan that allows you to take advantage of the current relatively high prices but leaves you the opportunity to share in the volatility of a weather market later in the marketing year. Buyers, write a marketing plan that protects you from the potential high prices of a spring weather market.

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